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ORIGINAL ARTICLE

Mentor-Mentee Publications in Academic Medicine: A Comparative Review of Indian and International Practices

Lakshminarayana G.R.[1], Sheetal Lakshminarayana[2]

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ABSTRACT

Background: Mentorship is crucial in academic medicine. It affects research output, career growth, and scholarly work. The nature of mentor-mentee relationships, especially regarding authorship and publication practices, differs widely across regions and cultures.

Objectives: This review looks at how mentor-mentee publication patterns in India compare to those in other countries. It explores authorship ethics and disputes, examines factors affecting collaborative output, and highlights best practices for ethical authorship in mentorship.

Methods: We conducted an extensive literature search across multiple databases, including PubMed, PMC, and institutional repositories. We reviewed studies published between 2010 and 2026 that focused on mentorship, authorship practices, publication productivity, and ethical issues in academic medicine. The review included both quantitative and qualitative studies from India, the United States, Europe, the Middle East, and other regions.

Results: There are notable differences between Indian and international mentorship models regarding structure, authorship practices, and publication results. International programs, especially in the United States, show higher rates of matching mentors and mentees based on preferences (77.8% compared to 25% in Indian programs), more regular meetings, and better compliance with International Committee of Medical Journal Editors (ICMJE) authorship criteria. India struggles with issues like gift authorship (60% in some studies) and authorship disputes, particularly among postgraduates. It also lacks formal mentorship frameworks. However, new initiatives are promising, as structured mentorship programs have led to better research output and publications.

AUTHOR'S AFFILIATION:

[1] Consultant Nephrologist, Department of Nephrology, EMS Memorial Co-operative Hospital and Research Centre, Perinthalmanna, Malappuram, Kerala, India.

[2] Professor, Department of Physiology, MES Medical College, Perinthalmanna, Malappuram, Kerala, India.

CORRESPONDING AUTHOR:

Lakshminarayana G.R., Consultant Nephrologist, Department of Nephrology, EMS Memorial Co-operative Hospital and Research Centre, Perinthalmanna, Malappuram, Kerala, India.

E-mail: drlng23@gmail.com

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Conclusions: Effective mentorship can significantly boost publication productivity in all settings, but the way it is implemented varies. To improve mentor-mentee collaborations in India and globally, it is important to tackle cultural and institutional obstacles, set clear authorship guidelines, establish structured mentorship programs, and encourage adherence to ICMJE criteria.

KEYWORDS

• Mentorship • Authorship Ethics • Academic Medicine • Research Productivity • Icmje Criteria • Gift Authorship • India

INTRODUCTION

The academic medicine field depends on mentorship which represents a vital cooperative partnership that determines academic success and research output and academic growth.[1,2] The mentor-mentee relationship extends beyond knowledge transfer to encompass professional guidance, skill development, and collaborative research that often leads to common publication outcomes.[3]

The relationships display different characteristics because their structure and results depend on the particular geographical and cultural settings which create challenges to establish proper methods and assess ethical matters. Scholars in academic medicine achieve their highest level of professional success through publication which functions as the main academic currency that helps their career progression and funding acquisition and institutional standing.[4]

The mentor-mentee dyad conducts research together which results in joint publications that demonstrate their relationship progression. The research partnership creates ethical challenges because it requires determination of who deserves authorship and how recognition should be given and how contributions should be acknowledged.[5,6]

India serves as an ideal case study to investigate mentorship and publication methodologies because it develops its medical education system while increasing its research output. Indian institutions face multiple difficulties which include hierarchical academic structures and insufficient research training and resource constraints and cultural factors that affect mentor-mentee relationships although they produce numerous medical graduates and increase their research output.[7,8]

The development of research mentorship programs and ethical publication methods requires an understanding of Indian practices to international standards which include high-income countries as the reference point.

The study investigates how India compares to international standards through its analysis of mentor-mentee publication records which specifically assess authorship-based ethical standards and research output and mentorship frameworks and regional research obstacles. The review intends to identify optimal research methods through its evaluation of existing evidence which will help establish best practices and create methods to enhance worldwide collaboration between mentors and mentees.

DISCUSSION MENTORSHIP MODELS AND STRUCTURES: GLOBAL PERSPECTIVES

Formal versus Informal Mentorship

Academic medicine uses mentorship to create formal programs which operate at different levels of structure through their development of informal connections between people.[9] The United States medical schools have increasingly established formal mentorship programs with specific requirements which include structured systems and scheduled meetings and evaluation standards and accountability systems.[10]

The comprehensive review showed that 47.2% of published mentorship studies originated from the United States while 42.1% came from Europe and 31.6% originated in the Middle East.[9] The formal mentorship programs establish fundamental elements which include structured pairing systems through random methods and user preferences and questionnaire-based matching and assigned meeting times and project goals and evaluation

methods and organizational assistance.[11] United States-based programs demonstrate preference for questionnaire and preference-based pairing strategies (77.8%) compared to international programs which more commonly use randomized pairing (75%).[9]

The two approaches to mentorship differ because one method matches individuals through personal selection while the other method provides all users equal access to resources. Informal mentorship develops through natural growth between two people who share common interests and build personal connections and find chances to work together. Informal mentorship enables people to create real relationships but it creates problems for equitable access because it lacks systems to ensure responsibility.[12]

Research indicates that hybrid systems which combine established structures with natural relationship creation enable organizations to achieve their best results.[13]

Mentorship Structures in India

The present study investigates the mentorship structures that medical schools in India have adopted to assist their undergraduate students. Indian medical education has traditionally relied on informal mentorship relationships which develop through departmental hierarchies and supervisor-trainee interactions.[14] However medical colleges now use formal mentorship programs which extend to all undergraduate students since they became common in educational institutions during the last ten years.[15,16] A study from India reported introducing mentorship to first-year medical students who needed dedicated support because they faced stress and emotional difficulties and adaptation problems which required structured support.[16]

The process of mentorship in India requires more structure for postgraduate medical education and faculty development because it usually happens during thesis supervision and departmental cooperation activities.[17]

The mentor-to-mentee ratio tends to be high which restricts the amount of time that mentors can provide to each student. The Indian medical college faculty mentorship program included a mentor-to-mentee ratio of 1:2 which showed a lower value than what most Indian universities follow according to common practice.[8] Indian medical education has made progress with its new structured research mentorship system which provides support to faculty members. The research project mentorship model from one study allowed students to gain experience through active learning which included both protocol development and manuscript writing modules.[8] The eight faculty members who took part in the study completed both the protocol development and the ethics committee submission process while five faculty members submitted their manuscripts to peer-reviewed journals before the deadline. Participants showed a better evaluation of their research abilities while they developed a positive view about research activities according to the study results.[8]

Meeting Frequencies and Engagement Patterns

The outcomes of interactions between mentors and mentees depend on two factors which are their meeting frequency and their interaction quality. United States programs require more frequent meetings because 83.3% of American programs establish monthly meeting times whereas only 30.0% of international programs do the same.[9] More than half of all reviewed studies reported mentors meeting with mentees more than once per month.[9]

The relationship between meeting frequency and publication output together with mentee contentment shows a direct connection. Studies show that researchers who work with their main mentor for three or more years achieve higher publication output (incidence rate ratio [IRR] = 1.76).[18] The duration of a mentorship relationship enables mentors to establish stronger connections with their mentees which leads to extended project work and the creation of research articles that reach publication standards.

In India different institutions experience different meeting patterns which stem from their institutional culture and faculty workload and their mentorship system implementation. Informal mentorship may lead to sporadic interactions which occur when required but scheduled programs with set times enable regular interactions to take place.[8] The resource-limited environment requires organizations to find ways to balance their clinical service commitments with their responsibilities for teaching and administration and their need to provide mentorship.

AUTHORSHIP ETHICS AND GUIDELINES

ICMJE Authorship Criteria

The International Committee of Medical Journal Editors (ICMJE) has established widely accepted criteria for authorship which they updated most recently in December 2021.

The criteria for authorship define that authorship should be determined when all four conditions have been met:

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work;
- Drafting the work or revising it critically for important intellectual content;
- Final approval of the version to be published;
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

The ICMJE recommendations require that authors must take responsibility for their own contributions while being able to identify their co-authors who worked on different sections of the project and they should believe in their co-authors' honesty.[20] Individuals who fail to satisfy all four criteria should receive acknowledgment instead of being recognized as authors. Authors who fulfil these strict requirements will receive credit for their work because they can prove their work responsibilities.

Authorship represents an essential academic and social status which provides financial benefits that include career progression and access to research funds and establishment of professional standing in the field. Authors bear the obligation for their published research which includes answering inquiries about research integrity and handling any discovered errors or misconduct.

Gift Authorship and Honorary Authorship

International guidelines define appropriate authorship standards, yet authorship misconduct continues to occur worldwide while specific situations present particular difficulties. The practice of "gift authorship" or "honorary authorship" allows institutions to designate individuals as authors who fail to meet ICMJE requirements because they possess seniority or publication capabilities not intellectual expertise.[21,22]

The available Indian data reveals a disturbing situation. The study by Shah *et al.* demonstrated that 60% of authors in Indian biomedical journals published articles with gift (honorary) authorship which violated ICMJE standards.[22] The rate of honorary authorship in high-income countries shows substantial decrease from global levels. A study analysing publications from multiple countries found honorary authorship rates varying from 17.6% to 33% across different medical specialties and regions.[23]

The practice of gift authorship exists in various situations which apply to the mentor-mentee relationship. Supervisory authorship: Department heads or senior faculty included based on position rather than contribution. Facilitating authorship: Individuals who provided access to resources data or administrative support but did not meet intellectual contribution criteria. Multiple authors join multi-centric studies which exceed authorship requirements through their inflated contributions. Two emerging contexts for gift authorship in India warrant particular attention.[25] First international research partnerships between Indian institutions and high-income nations require partners to create lengthy author lists.

Authorship Disputes in Indian Context

The academic medical field in India faces major difficulties with authorship disputes which particularly impact postgraduate students and junior faculty members. The power imbalances between parties involved in disputes create unclear expectations whereas institutions fail to provide adequate methods for resolving their conflicts.

Common scenarios which lead to authorship disputes in India include the following situations

- Postgraduate residents who complete substantial research work for publication purposes should receive proper authorship recognition yet they remain uncredited.
- Senior faculty members request their name to be added as project authors on resident work even though they only made a small contribution.

- Two senior authors of a manuscript changed its authorship list after completing their work on the document.
- Disputes occur about who should receive authorship credit especially for first author and corresponding author positions.
- Trainees and departing faculty members use departmental data without permission or proper citation.
- Retiring faculty members who produced work that others published later faced authorship denial.

A case discussed in the literature highlighted these tensions, describing disputes between postgraduates and mentors regarding authorship attribution and the sequence of authors.[26] The article recommended that projects should establish explicit role agreements including authorship rights at their launch time whereas conflict resolution systems should handle disputes between parties and organizations should establish fair and accountable operational practices.[26]

Mentor-mentee relationships develop through power dynamics because mentors control more institutional power which includes their professional resources and job security.[27] In Indian academic institutions that operate with hierarchical structures junior researchers face challenges when they want to receive proper authorship credits because they fear that they will lose professional connections and their careers will suffer from this situation.[28] This power asymmetry necessitates institutional protections and clear ethical guidelines to ensure fair authorship practices.

INSTITUTIONAL POLICIES AND GUIDELINES

Recognition of authorship challenges has prompted institutional responses in India and internationally. The Indian Council of Medical Research (ICMR) National Ethical Guidelines for Biomedical and Health Research Involving Human Participants (2017) explicitly endorse ICMJE guidelines for responsible authorship and publication.[23] This development helps Indian institutions establish standardized ethical authorship standards which guide their research activities.

Several Indian medical institutions have developed institutional authorship policies which define specific situations that lead to their required author procedures. JIPMER's authorship policies detail different publication types which include original research and case reports and review articles.[25]

The main elements of the document contain these details:

- Authorship must be based on fulfilment of all four ICMJE criteria
- No faculty member should demand authorship without meeting criteria
- For case reports, at least one faculty member involved in diagnosis and management should be included
- Inter-departmental collaborations should base authorship on contribution per ICMJE criteria
- Authors must read, approve, and take public responsibility for manuscript content before submission

Some institutions in the Philippines have developed comprehensive co-authorship guidelines for undergraduate and graduate programs which distinguish between different research contexts and specify when mentors may be included as co-authors.[30] The guidelines state that mentors become co-authors only when they meet criteria for substantial contributions while advising students who wish to present their research with recognition as the main researcher.[30]

Publication Productivity in Mentor-Mentee Relationships

Impact of Mentorship on Research Output

The existing evidence shows that successful mentorship programs lead to increased publication rates in various research environments.[31,32] According to social exchange theory mentorship benefits both mentors and mentees because it helps them increase their work output.[33] Blackburn *et al.* found that academics with mentees achieved 21-25% more scholarly publications than those without mentees,[33] highlighting reciprocal benefits. The network analyses show how mentorship programs lead to increased productivity through their operational functions.

The study found that mentoring led to future research collaborations through social network analysis which included descriptive methods and visual representation and modeling

techniques which confirmed this relationship with statistical significance ($p = 0.009$), and for grant submissions ($p = 0.003$), and publications ($p = 0.017$).[34] The network models predicted that each new mentoring relationship would boost scientific collaboration rates which would occur two years later by nearly 7%.[34]

The results from mentoring relationships show how their duration determines achievement results. Investigators and trainees who worked with primary mentors for three or more years published their work at a higher rate (mean = 11.33) than those who worked with their mentors for a shorter time period (mean = 6.37), $p = 0.013$.[18] The extended relationship allows for project maturation, skill development, and completion of rigorous research suitable for publication.

Mentor Characteristics and Publication Success

Different types of mentorship relationships produce different results for publication output because the characteristics of mentors determine which results will occur. A study of pharmacy residency research found that projects with mentors having three or more publications achieved higher full publication rates compared to those with less experienced mentors (50.0% vs 8.6%, $p < 0.001$).[35] Mentors who possessed at least one first-author publication created better chances for their mentees to publish work (37% vs 7.7%, $p = 0.001$).[35]

Mentees who begin their research careers need mentors who have shown their capacity to publish work because this requirement is essential for their development. Experienced mentors possess greater knowledge of publication processes and journal selection and manuscript preparation and revision strategies and response to reviewers—expertise that substantially facilitates mentee publication success.

Faculty member participation in resident research projects increased manuscript publication rates significantly (63.6% vs 11.9%, $p = 0.008$).[35] The research demonstrates that formal faculty engagement which extends beyond basic supervision duties produces substantial results for publication success. New practitioners interested in precepting research projects should include mentors who have published research successfully because this will help them achieve project goals and share their findings with others.[35]

The academic networks through which mentors stay connected to each other create an effect which determines how effectively mentees complete their work. Early career academic generalists who worked with mentors that established extensive contacts within the generalist community experienced improved outcomes for their published peer-reviewed work.[36]

Mentorship and Grant Funding

Grant funding functions as both a result of successful mentorship programs and an aid that boosts publication output. Mentees who received grant-writing mentorship demonstrated higher probability of publications.[18] Funded project work leads to increased publication counts according to the study which found an IRR of 1.89 while controlling for other variables.[18] Grant-writing and funding mentorship programs showed positive effects on publication output according to the study which found an IRR of 1.72 while controlling for gender and career development.[18] Grant-writing mentorship improves funding success because it provides research resources for researchers who want to publish their work. Active grant holders use their funding to support research work that creates publication chances for their mentees.

The Indian research system faces obstacles because of its restricted funding and the need to compete for research grants. Faculty development programs now understand that teachers require practical skills in grant writing and research funding through direct mentorship contacts instead of traditional theoretical instruction.[8] Mentorship programs that incorporate structured mentorship with grant proposal development training have demonstrated effectiveness according to an Indian study which showed all study participants finished their protocols and followed the necessary procedures through ethics committee review.[8]

Collaborative Research and Multi-Authorship

The research networks established through collaboration present a critical research area which remains insufficiently studied among medical trainees and students in India. The research models enable expert researchers with

different abilities to conduct top-tier research work which provides enhanced educational experiences. The use of common corporate author publishing allows all research partners to receive proper credit for their work while fostering cooperative efforts and creating a framework for future projects to follow.[37]

The STAR SURG collaborative research study by UK medical students provides an exemplary model, including 1513 patients from 109 centres with each author given equal recognition.[37] Student-led collaborative projects give students practical experience in academic training while showing students different approaches to authorship which does not follow the traditional hierarchical system.

International and multi-centre research partnerships create problems which involve determining who should receive authorship credit. The emergence of publications with dozens or hundreds of authors, particularly in global health research, requires careful attention to ensuring all listed authors meet ICMJE criteria.[25] The roles of coordination work require essential functions but they do not provide enough intellectual input to qualify for authorship. The complex nature of research projects requires researchers to establish their specific contributions while properly recognizing all individuals who assisted them.

COMPARATIVE ANALYSIS: INDIA VERSUS INTERNATIONAL CONTEXTS

Structural Differences

The mentorship programs which operate in India exhibit their major structural differences which set them apart from the Western-based international programs. The United States programs maintain structured operations which involve matching through personal preferences and scheduled meetings and specialist training and established program goals.[9] The programs provide faculty mentorship training together with evaluation systems and institutional backing which enables their implementation.

Indian medical education has historically relied on apprenticeship models which operate through hierarchical departmental structures.[14] The practice of formal undergraduate mentorship has become more popular during the last ten years since multiple educational institutions started their mentorship programs.[15,16] The existing system employs mentorship through supervisor-supervisee relationships which do not use explicit mentorship guidelines to support postgraduate and faculty development.[17]

The implementation of mentorship programs requires organizations to handle their resource constraints. The institutions in high-income countries maintain better resources which enable them to establish dedicated mentorship time together with their administrative and training and evaluation capabilities. Indian institutions operate under various limitations which include excessive clinical and educational responsibilities and insufficient research resources and funding and a high student-to-faculty ratio.[7,8]

Cultural and Hierarchical Influences

Cultural elements determine how mentorship relationship's function and how authorship work is conducted. Indian academic culture traditionally emphasizes hierarchy, seniority, and respect for authority.[38] The values create organizational stability, but they create obstacles that prevent junior researchers from questioning improper authorship practices and fighting for their rightful credit.[28]

Collectivist cultural orientations in IndiaAnd other Asian settingsprefer group harmony over individual recognition according to the research.[39] This situation creates pressure to make senior faculty members authors even when they did not contribute, which also stops people from questioning authorship choices that harm junior staff members. Power distance describes how much less powerful organization members accept power distribution between leaders and followers. Indian environments show high power distance, which creates authorship hierarchies that do not match work-based contribution standards.[40]

Western academic cultures, which include North America and Europe, now give more importance to individualism and merit-based recognition and research attribution transparency.[41] The cultural environment presents authorship challenges, yet it creates an atmosphere where people discuss authorship openly and refuse to accept improper practices.

Ethical Awareness and Training

International medical schools, especially in developed countries, increasingly incorporate research ethics training into curricula, which includes specific instruction on authorship ethics.[42] Responsible Conduct of Research (RCR) training in the United States typically includes modules on authorship, collaboration, and conflicts of interest.[43] The training raises awareness about correct practices while it gives people the tools they need to manage their authorship choices.

Formal research ethics training in India has not yet become a standard part of medical education.[44] Many medical students and residents receive insufficient training on authorship ethics which they only discover through short references in research methodology courses, despite progress in this area.[45] The Medical Council of India (which now operates as the National Medical Commission) has established a basic biomedical research course requirement, and the Indian Council of Medical Research has introduced Swayam platform online courses.[8]

Indian institutional ethics committees concentrate on safeguarding research participants instead of managing publication ethics matters.[46] The current system needs expansion to cover authorship practices through ethics education and institutional oversight.

Publication Outcomes and Quality

Worldwide evidence shows limited research about publication results from mentor-mentee partnerships which exist between different countries. The available evidence shows that high-income countries which implement well-organized mentorship systems achieve high publication output. The graduate medical education program showed that all residents presented their work at grand rounds while 52% of them published their research in peer-reviewed journals through structured mentorship.[13]

The structured mentorship program for medical faculty in India showed that six out of eight program participants attended the manuscript writing module and five of them submitted their manuscripts to peer-reviewed journals within the required time period.[8] The program achieved success through its executed achievements yet it faced difficulties because some program participants failed to finish their training and their publication results remained unknown.

Predatory journal publications create a major problem which affects India and the rest of the world.[47] Faculty members with no formal research training who need to publish academic work for promotions will become targets for predatory publishing companies.[8] The increasing number of predatory journals during recent years has particularly harmed researchers from low-and middle-income countries because these journals jeopardize research integrity while consuming essential research resources.[48]

CHALLENGES AND BARRIERS

In Indian Context

Several interconnected challenges impede optimal mentor-mentee publication practices in India:

- **Limited research training:** Many medical faculty members lack formal research training because they have received only doctoral education which restricts their ability to guide students in research and publication work.[8]
- **High clinical workloads:** The substantial requirements of clinical service work force professionals to dedicate their time exclusively to clinical duties which limits their capacity to conduct research and supervise scholarly work.[49]
- **Resource constraints:** Research productivity gets hindered by financial limitations and deficient research facilities and lack of general administrative help.[7]
- **Hierarchical structures:** The existence of traditional academic hierarchies creates a system that enables researchers to receive improper authorship credit while preventing junior researchers from demanding their rightful recognition.[28]
- **Lack of conflict resolution mechanisms:** Most institutions lack established procedures to handle authorship conflicts which leads to unbalanced power dynamics between the involved parties.[26]
- **Inadequate recognition of mentorship:** Faculty members face less incentive to participate in mentorship because institutions fail to recognize mentorship

work as valuable for their promotion process.[50]

- **Publication pressures:** The need for academic publications to achieve academic promotions creates a system which leads practitioners toward using unethical methods because they lack proper educational resources and institutional help.[22]

Global Challenges

High-income countries display better mentorship resources but face difficulties which continue to exist throughout the world:

- The mentorship process suffers from unequal access which affects all underrepresented minority (URM) investigators and trainees who publish research at lower rates than their well-represented colleagues (IRR = 1.66) because different levels of mentorship they receive result in two distinct consumption patterns of learnable material.[18]
- Faculty members at well-resourced institutions encounter competing responsibilities which restrict their ability to provide mentorship.[51]
- Faculty members who serve as mentors need formal mentorship training yet most of them lack such training.[52]
- Academic institutions worldwide fail to provide enough recognition for mentorship work which affects academic progression decisions throughout the world.[53]
- The power dynamics between mentors and mentees create situations where mentors possess authority to misuse their power for improper distribution of credit.[27]
- Women in academic medicine experience additional difficulties because they lack effective mentorship and proper recognition for their authorship work.[54]

BEST PRACTICES AND RECOMMENDATIONS

Establishing Clear Expectations

Evidence shows that project teams should create explicit agreements which define their roles and responsibilities and their authorship obligations from the beginning of their work.[26,30] Written agreements specify the expected contributions of parties involved while establishing authorship criteria and methods for resolving disputes which protect both mentors and mentees. The agreements need to include:

- Specific roles and responsibilities of each collaborator
- Expected contributions to conception, design, data collection, analysis, writing, and revision
- Anticipated authorship order and criteria for determining order
- Decision-making processes for authorship inclusion
- Procedures for addressing disagreements
- Timelines and milestones
- Data ownership and access policies

The project team requires these agreements to evolve because actual contributions need to be tracked through project development. The combination of flexibility and documentation creates a system which prevents misunderstandings while establishing a process to resolve any disputes that may occur.

Implementing Structured Mentorship Programs

Evidence from both Indian and international contexts demonstrates the value of structured mentorship programs with defined components.[8,11,13] The effective programs require these components:

- The mentor-mentee relationship needs to be established through an assessment of their common interests and learning objectives and their ability to work together
- The establishment of meeting times: The protected time for mentorship activities needs to happen through scheduled meetings which should occur at least one time every month
- The curriculum needs to be organized into modules which teach research skills and grant writing and manuscript writing and publication processes
- The learning process requires students to actively participate in real research activities instead of following traditional teaching methods

- Programs should establish mentor networks because most mentors do not have the complete set of required knowledge in their field
- Organizations need to establish their evaluation systems which include both mentorship assessment and problem resolution processes
- The shift from theory-driven research methodology workshops to practical, project-based mentorship represents an important evolution in Indian medical education.[8] The programs which use active learning together with refinement periods and two-step skill development (which starts with protocol development and ends with manuscript writing) achieve better research productivity results.

Training Mentors

Mentors need additional skills because research expertise does not provide sufficient support for their mentoring duties. Faculty members need training programs that teach them how to mentor which should include these specific topics:

- Characteristics of effective mentorship relationships
- Communication strategies and providing constructive feedback
- Supporting mentee professional development and career planning
- Authors must follow ethical standards while they apply ICMJE criteria for their work
- Organizations need procedures to identify power imbalances and create solutions
- Participants need to develop cultural competence to engage effectively with their diverse mentees
- Conflict resolution and addressing authorship disputes
- Mentors need time management skills to handle their mentoring responsibilities

International best practices increasingly include mandatory mentorship training for faculty serving as research supervisors.[55] Indian institutions that adopt similar requirements will experience enhanced mentorship programs which lead to better results

Promoting ICMJE Adherence

Institutions and journals should promote adherence to ICMJE authorship criteria through multiple mechanisms:

- The educational system should teach authorship ethics together with research methodology and medical continuing education training.
- Institutional policies: Developing and enforcing clear institutional authorship policies aligned with ICMJE criteria
- Researchers need to submit documents which describe their specific contributions to the research project through detailed contributor-ship statements.
- Pre-submission review: Institutional review of authorship before manuscript submission to ensure compliance with criteria
- **Conflict resolution mechanisms:** Establishing clear procedures for addressing authorship disputes at departmental and institutional levels

Academics should face disciplinary action when they engage in unauthorized authorship practices which affect their faculty promotion and hiring process.

Journals which publish Indian research must follow strict authorship requirements by demanding authors to provide detailed contributor-ship information and they need to investigate any submissions with authorship patterns which indicate gift authorship.[22]

Leveraging Collaborative Networks

The research networks which include student-led projects and multiple university partnerships serve as alternative systems to conventional mentor systems which depend on hierarchical authority.[37] The networks provide multiple benefits which include:

- They give users access to various expert knowledge and resources
- Their system allows users to engage in larger research projects which have superior research results
- The system enables users to learn through peer-to-peer mentoring relationships
- The system uses corporate and group authorship systems to distribute credit among all contributors

- The system decreases the existing power imbalances which exist between individual mentors and their mentees
- The system establishes research training environments which promote community development

The existing mentorship systems in Indian medical education should be expanded through collaborative research programs which will develop research capabilities for future medical students and trainees.[37]

Institutional Support and Recognition

The institutions need to establish the necessary resources for mentorship operations while they should also acknowledge how mentorship work impacts faculty assessment and promotion process. The recommendations include these items:

- Faculty members should receive dedicated time to conduct mentorship work which should count as part of their overall professional responsibilities.
- Institutions should allocate resources to support both mentorship programs and the necessary operational facilities.
- Organizations should make mentorship achievement their standard requirement for employee promotions.
- Organizations should create special awards to recognize mentors who demonstrate exceptional performance.
- Organizations need to assess mentorship programs through ongoing assessments of both their effectiveness and their achieved results.
- Organizations require administrative assistance to manage their mentorship initiatives.
- Organizations should provide professional development programs which teach mentorship skills to their employees. Organizations require institutional backing to establish mentorship programs as their primary academic purpose instead of viewing mentorship as a voluntary activity which lacks necessity.[53]

Addressing Cultural Factors

The Indian and other locations which have hierarchical systems and cultural traditions that shape their authorship practices require specific interventions to address their needs. The following interventions should be implemented to address this need:

- Open discussions about cultural influences on authorship practices
- Leadership role modelling of ethical authorship behaviour
- Empowering junior faculty and trainees to advocate for appropriate credit
- Creating safe mechanisms for reporting authorship concerns
- Promoting culture change toward merit-based, contribution-focused authorship
- Recognizing and valuing collaborative rather than hierarchical approaches

To achieve culture change organizations, need to maintain their efforts while developing their leaders who must oppose traditional practices that have become ingrained in their institutional customs.

FUTURE DIRECTIONS

Research Needs

The research on mentor-mentee publication patterns from developing countries shows major shortcomings in its current state. The researchers have identified their main research objectives which include the following three areas of study:

- All Indian educational institutions need to undergo complete evaluation of their mentoring systems together with their resulting outcomes.
- The study will compare the effectiveness of different mentoring systems which operate in environments with limited resources.
- The study will track how mentorships develop over time while measuring their impact on academic publications during their entire professional work life.
- The study will evaluate methods designed to enhance authorship ethics while decreasing instances of gift authorship.
- The study will examine how cultural elements shape the collaborative relationship between mentors and mentees and their methods of creating authorship work.

- The study will analyze the financial expenses of mentorship programs together with their resulting economic benefits.
- The study will examine how gender, caste, and other identity characteristics shape the accessibility and mentorship quality to different groups of people.

Policy Developments

The following requirements need implementation for publication support through mentor-mentee relationships which need support from institutional and national policies:

- National Medical Commission standards establish mentorship requirements for medical colleges.
- All medical students and faculty must complete research ethics training which includes authorship components.
- Institutional authorship policies need development according to ICMJE criteria through enforcement mechanisms.
- Conflict resolution systems to handle authorship disputes.
- Academic advancement criteria involve recognizing mentorship work.
- Funding mechanisms to support development of mentorship infrastructure through financial resources.

Technology and Innovation

The following technological tools support better mentorship programs and ethical authorship processes:

- Digital platforms for documenting contributions and tracking authorship agreements.
- Online mentorship training modules accessible across institutions.
- Virtual mentorship networks connecting mentors and mentees across geographical distances.
- Authorship contribution tracking tools integrated with research project management systems.
- Data analytics tools that identify authorship patterns together with potential ethical concerns.

CONCLUSION

The academic medicine field relies on mentorship to produce research results while advancing professional growth, which leads to mentor-mentee relationships producing publication results. The mentorship systems of India show distinct differences from international mentorship systems, which leads to different outcomes for authorship and publication practices. High-income countries possess better mentorship systems than developing countries, yet worldwide problems continue to exist for authorship ethics, mentorship access, and contribution acknowledgment.

India faces particular challenges including high prevalence of gift authorship, hierarchical academic structures, limited research training, resource constraints, and inadequate institutional mechanisms for addressing authorship disputes. The new initiatives show that organized mentorship programs produce better research abilities and publication results for organizations that have limited resources.

The solution for these challenges needs multiple strategies which include: creating project-level authorship standards at the beginning of work, establishing mentorship programs that follow particular guidelines, teaching mentorship skills to teachers, ensuring compliance with ICMJE authorship standards, using research networks for collaboration, establishing institutional mentorship programs that receive backing and acknowledgment, and tackling cultural aspects that shape authorship standards.

The goal of the project involves developing ethical mentor-mentee partnerships which produce knowledge while improving research capabilities and maintaining scientific research integrity. Indian institutions can improve their mentorship programs and authorship standards through international best practices which combine with their specific local requirements. Institutional leaders, professional societies, funding agencies and journals together with researchers must maintain their dedication to support institutional progress. The creation of mentorship-friendly environments which accurately show authorship contributions will create advantages for mentors and mentees and institutions and result in progress for medical science and patient care.

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